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An Action Program For Airport Related Noise Abatement

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Massachusetts Aeronautics
Commission

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The Commonwealth of Massachusetts
Aeronautics Commission
Boston - Logan Airport, Boston 02128

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MASSACHUSETTS AERONAUTICS COMMISSION NOISE ABATEMENT PROGRAM

INTRODUCTION

Aircraft noise and its effects have led to a significant airport noise problem in the Commonwealth and widespread public mistrust and hostility toward airport development.

For some communities surrounding airports, noise is a serious disturbance which interferes with the rights of airport neighbors to enjoy fully their homes and property. Because of this legitimate environmental concern, airport improvement and modernization has been inhibited. If this trend continues, reinforced by increased noise, it could significantly affect the quality of the Commonwealth's air transportation facilities, with resulting impacts for individual airport users in particular and the economy of the Commonwealth in general.

Aviation noise has been a major national problem for over 25 years. It has been recognized, studied, analyzed and restudied. The problem continues to be compounded by inaction, resulting primarily from the failure of existing state and federal legislation and regulations to assign clearly responsibilities and powers for noise control. The unquestionable lack of national leadership by the federal government has prompted several states to begin to define their own role and responsibility in this area. Massachusetts is one of these states. The discussion which follows reviews the recent efforts of the Massachusetts Aeronautics Commission to deal with airport related noise; and, by outlining a noise abatement program, indicates the policy course that the Commission intends to chart in the months and years ahead.

BACKGROUND

Our recent noise abatement efforts have come under the rubric of the Massachusetts Airport Noise Study. This project flowed from a recommendation of the 1973 Massachusetts Airport System Plan, prepared jointly by the Massachusetts Aeronautics Commission and the Massachusetts Department of Public Works. This plan recommended that the Commonwealth adopt an airport noise abatement policy, and suggested the following as a goal:

> "The total amount of noise sensitive area surrounding an airport and currently subjected to unacceptable levels of aircraft noise shall not grow larger than it is today, shall be reduced to half by 1980, and shall be reduced to zero by 1985."

In order to determine how best to reach this goal, the Commission engaged the acoustical consulting firm of Bolt Beranek and Newman Inc. (BBN) for the following 3 segment scope of work:

1. An outline of any noise abatement enabling legislation which might be necessary.

2. A detailed study of the noise situation at 8 specific airports: Beverly, Hyannis, Lawrence, Norwood, Otis Air Force Base, South Weymouth Naval Air Station, Westfield, and Worcester. Bedford-Hanscom, managed by the Massachusetts Port Authority, has undertaken a similar noise analysis as part of its Master Plan. A key goal of this work segment was development of an objective description of "unacceptable levels of aircraft noise".

3. Alternatives for reaching the Commission's noise reduction goals.

BBN's assignment represents the technical part of the study.

At the beginning of the study, the Massachusetts Airport Noise Study Advisory Group (MANSAG) was formed. Chaired by the Massachusetts Assistant Secretary of Transportation, MANSAG participants represent different interests, including affected industry associations and airport users, the FAA, state agencies, environmental groups, airport neighbors and other interested citizens. At the outset MANSAG reviewed the details of the study outline and participated in a subcommittee which selected the community liaison specialist who became part of the consultant's team for the job. Throughout the project MANSAG has particularly focused its attention on the development of the noise legislation by proposing, reviewing and critiquing alternative drafts.

MANSAG and the full time efforts of the community liaison specialist have constituted the citizen participation component of this project. Funding has been entirely with state money, despite our very strenuous efforts to secure federal grant participation through the FAA.

STUDY RESULTS

Legislation

The original target had been to file enabling legislation by November 1975, the deadline for departmental bills to be considered by the 1976 Legislature.

The idea was that the supporting studies would be completed and ready by the spring of 1976 when the bill would be scheduled for legislative hearings. Since the bill would have been shaped in large part by MANSAG, broad legislative support was anticipated.

However, it proved impossible to obtain a consensus on the consultant's draft or on any other. Everyone agreed that aircraft noise should be reduced at the source; i.e., propellers of piston aircraft and the engines of jets, but that this was a solution beyond the powers of the Commonwealth. Industry representatives felt that effective land use control was a must, to prevent residential development in noise impacted areas. Citizens' groups, on the other hand, tended to oppose land use controls, and favored instead aircraft type and operational restrictions.

To break the impasse, the Secretaries of Transportation and Environmental Affairs were asked to take the various consultant's and other drafts and to come up with a workable compromise. A bill was prepared, and after discussion at MANSAG meetings and regional sessions, was revised and put in proper legislative language by Counsel to the Senate. This has been filed for consideration by the 1977 Legislature. The MAC will continue to hold discussions on the bill and consider revisions preparatory to a legislative hearing expected in the spring of 1977.

Technical Work

Phase I Concurrently with their work on legislation, BBN assessed the existing situation at each of the eight airports. Their findings are described in detail in the report, "Massachusetts Airport Noise Study: Phase I - Noise Impact Around Eight Key Airports". In this, the consultant assumed that a recorded noise complaint indicated an unacceptable level of noise; and, subsequently, recommended the following possible noise exposure limits for residential areas based on this assumption, and the type of airport and type of activity involved:

POSSIBLE RESTRICTIVE NOISE EXPOSURE LIMITS

Type of Airport	Type of Activity	Noise Exposure Limit
Air Carrier	All Operations	L_{dn} of 65 dB
General Aviation	Itinerant Operations	L_{dn} of 55 dB or the annual average of the ambient L_{dn} plus 5 dB, whichever is greater
	Touch-and-Go Operations	L_{dn} of 50 dB or the annual average of the ambient L_{dn}, whichever is greater
All Airports	Military Jet Operations	L_{dn} of 70 dB

Phase II This report, entitled "Massachusetts Airport Noise Study: Phase II - Noise Abatement for Eight Key Airports," forecasts 1985 operations and considers alternative noise abatement measures to meet the suggested goal of zero unacceptable noise impact by 1985.

Based on certain assumptions for each study airport, such as number of operations, type of aircraft, and runway usage, the consultant makes the following 1985 forecast:

> For Beverly, Lawrence and Norwood: Noise exposure levels and the total area affected by noise will increase.
>
> For Westfield and Worcester: Noise exposure levels and the total area affected by noise will decrease.
>
> For Hyannis: Total area affected by noise will decrease. Noise exposure levels in more heavily populated areas will decrease while levels in less populated areas increase slightly.
>
> For Otis and South Weymouth: Noise exposure levels and the total area affected will increase due to military operations. The introduction of civil operations would add less than ½ decibel to the noise levels. A decrease or discontinuation of military operations would significantly lower the noise exposure levels.

After arriving at these forecasts for 1985, BBN identified alternative methods for reaching the noise exposure limits which had been offered as a possibility in Phase I (see above).

In addition to noise reduction at the source and land use controls, these alternatives included some restrictive operating procedures such as eliminating or restricting touch and go activity, setting night curfews, eliminating or restricting jet operations and restrictions on itinerant operations.

BBN concluded that use of such restrictive actions alone to meet the possible noise exposure limits proposed in Phase I would cripple civil air transportation and military air activities. Recognizing that the MAC goal of zero unacceptable noise impact could not be attained by 1985 without severely damaging aviation, the consultant then suggested revising the limits to a less stringent but more attainable level:

REVISED NOISE EXPOSURE LIMITS

Type of Airport	Type of Activity	Noise Exposure Limit
Air Carrier	All Operations	L_{dn} of 65 dB
General Aviation	Itinerant Operations	L_{dn} of 60 dB
	Training Operations	L_{dn} of 55 dB
All Airports	Military Jet Operations	L_{dn} of 70 dB

LOCAL ACTION

Noise problems and the need to address them were not suspended while BBN was performing the technical work for the Noise Study. Three local efforts -- in which the MAC was the catalyst -- have been particularly relevant noise abatement experiences. In Beverly and Norwood, noise abatement measures were designed by a local committee. Worcester, a third community, offers an important land use model.

Beverly and Norwood

Airport neighbors in communities surrounding both Beverly and Norwood were disturbed by noise resulting primarily from touch and go operations and some regular operations. A touch and go operation is associated with flight instruction and usually refers to a student pilot who is making repetitive takeoffs and landings. Instead of coming to a full stop, the pilot touches down on the runway and then takes off again, thus the name "touch and go".

In each community local noise abatement measures were developed by a committee representing many interests, including airport neighbors, airport users, the airport commission, the FAA control tower, local officials, and the MAC. Summarized below are the procedures or regulations that have been in effect over the past year: These pertain to all flights, but the major implication is for touch and go operations:

BEVERLY:

- Prohibition of touch and go operations during some hours, the most significant being from 1:00 PM to 5:00 PM on Sundays from May 1 to September 30.
- Touch and go traffic must be airborne within the first half of the runway in use.
- Prescribed traffic pattern altitudes, restriction on intersection takeoffs, and designation of a dominant runway (Runway 16/34, use of which affects less residents than does Runway 9/27).

The Beverly Airport Commission also adopted a policy that any future leases with new commercial and/or corporate operators using jet aircraft will require that such aircraft comply with the noise standards of Federal Air Regulation (FAR) 36.

NORWOOD:

- Touch and go traffic must be airborne in the first half of the runway. Depending on the location of noise sensitive residential areas, either right or left hand turns are required at the end of each runway.
- Prohibition of touch and go operations between the hours of 11:00 PM and 7:00 AM.
- Touch and go operations are permitted only with single engine aircraft.
- Minimum pattern altitude, traffic patterns, specific VFR departure routes and turns after departure are prescribed so as to avoid noise sensitive residential areas.

These procedures supplement the following three noise regulations adopted in recent years by the Norwood Airport Commission and approved by the Massachusetts Aeronautics Commission:

- No person shall operate any aircraft on Runway 10 so as to land prior to passing the marked displaced threshold.
- Jets not certified under Part 36 of the Federal Aviation Regulations are prohibited from takeoff on Runway 28 or landing on Runway 10.

A third regulation, adopted by the Norwood Airport Commission and approved after considerable deliberation by the MAC, became effective recently:

- No pure jet aircraft shall be regularly based at the Norwood Memorial Airport unless it complies with the provisions of FAR 36.

SUMMARY

Effect

One of the things we have learned in developing these local noise abatement measures is that there is a certain amount of trial and error involved. Our options are somewhat limited by the aircraft in use, the present number and type of operations, and the location of surrounding residential areas. At both Beverly and Norwood the locally developed noise abatement measures have aimed at getting aircraft airborne as far short of the departure end of the runway as practical and, once airborne, having them avoid the most developed residential areas. These local efforts have brought some noise relief to airport neighbors. They have not eliminated all noise problems and, in some very specific cases, they may have added to the noise experienced by individual residents or newly exposed some residents; but, on the whole, we feel that the situation has definitely improved for the majority of airport neighbors.

The key to any rules and regulations, of course, is enforcement. This task is somewhat complicated by constraints on each level of authority. On the local level the airport manager is the executive officer of the airport commission; few managers, however, have the time to monitor and enforce noise regulations on a continuous basis. On the state level, time and personnel constraints inhibit the MAC. The federal presence is felt only at those airports which have FAA control towers; Norwood and Beverly are two examples. While the FAA controller is a logical enforcement candidate, his primary mission is traffic separation; the FAA does not have a statutory obligation to participate in local noise abatement programs.

Given these caveats, the MAC has worked out a very modest arrangement with the FAA which permits the air controller, under certain conditions, to inform pilots of noise abatement regulations and to report violations.

Considerably more time and effort, however, must go into pilot education and dissemination of information regarding noise regulations. All levels -- local, state and federal -- must place special emphasis on this. Our efforts here in the Commonwealth would be particularly strengthened if the FAA and the DOT would articulate and implement what is a long overdue national aircraft noise policy, an important element of which should authorize greater participation by the FAA controller in the area of noise abatement.

WORCESTER:

Aircraft noise generated by operations at Worcester, an air carrier airport, does not have significant impact at this time because there is a good deal of undeveloped land surrounding the airport, most of which, however, is zoned residential. Worcester requested to be included as a study airport in this project so that ways of protecting the airport from future residential encroachment might be identified.

Somewhat ironically, a plan to construct over 450 homes south of the airport and off the end of Runway 33 was proposed during the past year. Using BBN's Phase I report we could predict that residents in a number of these homes would be impacted by noise ranging between (decibel) levels of 65-70 L_{dn}. An even greater number of homes were to be sited in areas where the noise levels are in the 55-65 L_{dn} range.

In an effort to insure a compatible use of this land, the City of Worcester is attempting to acquire over 100 acres by taking advantage of a new federal (90%) funding opportunity, authorized by the recently renewed Airport Development Aid Program. Local and state participation in this project, amounting to 10% of the total projected cost, was readily approved in August. We are still awaiting a funding commitment from the FAA.

CONCLUSIONS

Over the past two years the Massachusetts Airport Noise Study has been responsible, in whole or in part, for: the drafting of a comprehensive noise bill; instituting a full time community liaison program; ongoing dialogue with MANSAG, whose participants have been enormously helpful in shaping the project and to whom we owe considerable thanks for generous amounts of time and very thoughtful input; generating some very important local noise abatement efforts; and the technical work performed by BBN and contained in their Phase I and Phase II reports.

The MAC must now indicate to its various constituents -- airport proprietors, users and neighbors in particular -- how it will apply what has been learned from the study, particularly BBN's findings.

These findings have been most informative in picturing today's comparative levels of average noise in the vicinity of the study airports, describing what activities and types of aircraft contribute to this noise, and in forecasting what the situation will be in 1985. To provide significant noise relief we must not only lower existing noise levels but we must also prevent the increased noise levels forecast by BBN for 1985 from becoming a reality. This will not be an easy task.

The study is confirmation that the solution to the problem requires a three pronged attack which will combine noise reduction at the source, anti-noise operating procedures, and compatible land use in the vicinity of airports. The responsibility for applying these measures requires an unequivocal commitment, beginning immediately, from at least 6 key participants:

- The federal government must, without further delay, adopt and implement a national aircraft noise abatement policy, key elements of which have to be time phased rules establishing noise limits for all aircraft, and an active noise abatement role for FAA tower controllers.

- Manufacturers must take increased advantage of the technology which exists to produce quieter aircraft. Especially needed is greater source quieting of propeller driven aircraft which are the major users of our general aviation airports.

- Airport users have a three-fold responsibility: (1) quieting their aircraft either through retrofit or the acquisition of quieter planes; (2) developing and complying with anti-noise operating procedures; and (3) passing the noise abatement message along to other pilots.

- Airport proprietors must continue to develop and promulgate reasonable noise abatement measures. Enforcement efforts must be strengthened considerably. In addition, proprietors must play a more active role in promoting compatible land use around their airports.

- Localities, whose officials have the authority for land use decisions, must act more responsibly in applying land use controls that will prevent the construction of new residences in existing or forecast noise impacted areas. Also, local airport neighbors have a key role to play in working with airport users to design noise abatement measures and monitor their effectiveness.

- The MAC (State) must act on the seven point noise abatement program outlined below. This is a time phased program that is predicated on the cooperation of each of the agents identified above.

Our study was undertaken so that we might learn how to reach our 1973 noise abatement goal, the thrust of which was to confine unacceptable levels of aircraft noise within the boundaries of airports, their associated clear zones, and adjacent undeveloped land by 1985. Based on our experience and BBN's findings, we believe this to be an attainable goal, but not by 1985. This qualification is because of an almost complete lack of anticipated action by the federal government since 1973, and because we are several years behind our own schedule which includes state legislation necessary to enable us to do our part of the job adequately.

We believe that our noise abatement goal can be attained reasonably close to 1985 if the above participants act diligently on their respective tasks and the Commonwealth pursues vigorously the following program:

MAC NOISE ABATEMENT PROGRAM

1. NOISE STANDARDS

Establishment of Statewide Airport Noise Standards that will set forth maximum recommended noise exposure limits for different categories of land in the vicinity of airports.

Standards are essential:

(1) They will provide an equitable triggering mechanism to compel noise abatement action by a proprietor whose airport is generating an unacceptable level of aircraft noise. They will also provide a measure to determine compliance.

(2) They will assist local officials in making compatible land use decisions. For example, standards can establish unacceptable noise levels for residential land, thus providing criteria by which local officials may designate certain impacted or potentially impacted areas as unsuitable for the construction of new homes. As aircraft become quieter, the amount of land exposed to unacceptable levels of noise, and undesirable for residential use, will decrease.

The MAC noise bill, filed for consideration in the 1977 Legislature, provides for the setting of time phased airport noise standards for categories of adjacent land to be developed by the Department of Environmental Quality Engineering in consultation with the Massachusetts Aeronautics Commission and the Office of State Planning. Pending this development, we will explore the possibility of setting interim standards, drawing on BBN's work for guidance.

2. FUNDING

A serious noise abatement effort will cost money. A potential source of funding is the aviation fuel tax bill, filed by the MAC for consideration in the 1977 legislative session. This will impose a small aviation fuel tax, the proceeds from which would finance municipal airport aid projects and a noise abatement program. Vis-a-vis noise, this would fund the preparation of standards, aid to airports and localities in developing and implementing noise control measures and a staff to administer an ongoing noise abatement program. In particular, we could strengthen and enhance our capacity to offer technical assistance to airport managers and commissions; and to enforce effectively and consistently both existing and future noise abatement regulations.

AIRPORT NOISE STANDARDS and adequate FUNDING are essential to the establishment of an effective noise abatement program. Consequently, 1 and 2 represent high priority needs which we intend to pursue very actively in the coming months.

3. SITE SPECIFIC NOISE ABATEMENT MEASURES

Accelerate MAC efforts to assist localities in developing site specific operating procedures for providing noise relief, in cooperation with airport neighbors, aircraft operators, airport proprietors, airport managers and commissions and representatives of the federal government. Such an effort will include the following elements:

- Continued support and technical assistance to local airport user/airport neighbor noise abatement committees such as those now in effect at Beverly and Norwood.
- Establishment of similar committees at other airports before noise problems reach an unmanageable stage.
- Development of a list of local noise abatement regulations suitable for submission for MAC approval. This list will expand upon existing regulations by suggesting reasonable time phased application of noise abatement alternatives for reaching zero noise impact as identified by BBN in their Phase II report, such as:
    - -- Local noise rules for training, propeller and jet aircraft setting forth a schedule for compliance with FAR Part 36 and quieter standards.
    - -- Possible restrictions on certain activities, aircraft types, and times of operations.
    - -- Possible application of quota system for training and other flights.

- Increased MAC liaison with airport managers, proprietors and commissions to provide assistance in:
  - Identifying noise sensitive areas.
  - Improving communication with airport neighbors and developing greater sensitivity to airport related noise problems.
  - Developing and implementing effective noise abatement measures.
  - Disseminating noise abatement information to pilots.
  - Monitoring and enforcing compliance with noise abatement measures.

4. NOISE REDUCTION AT THE SOURCE

- The noise generating characteristics of aircraft powerplants must be reduced as fast as the technical, production, manufacturing, replacement, and economic constraints permit. This is clearly a national government and international industry responsibility.

  It has been demonstrated to be technically possible to produce both jet and propeller powerplants so quiet that unreasonable levels of noise impact on the ground could be confined within the boundaries of most airports and their prescribed runway clear zones. However, this will require money, time, and constant, effective public pressure to bring about the necessary technical development and subsequent retrofit, replacement, or retirement of the present fleet of noisy aircraft.

  As we did early this year, through the testimony of the National Governors Conference and the National Association of State Aviation Officials, before the House Committee on Public Works and Transportation, we will continue to urge the federal government to act in the following areas:

  - The Congress and the Administration should adopt a ten year national aircraft source noise reduction target for each category of civil aircraft.
  - This target should be made mandatory by an appropriate amendment to FAR 36 to apply to all old and new airline and general aviation aircraft on or before January 1, 1986.
  - All air carrier aircraft should be required to comply with the present FAR 36 as soon as practical, but in no event later than January 1, 1982, or be barred from flight in the U.S. at that time.

  - The Congress should authorize the DOT to use up to $1 billion of surplus Airport and Airways Trust Fund money to pay for the cost of retrofitting those airline aircraft in the U.S. civil air carrier fleet powered by the JT3D and JT8D, or if the owner chooses retirement instead, up to an equal amount towards the cost of this, provided there is no net economic benefit, either directly or indirectly, conferred upon the aircraft owner.

- Explore the feasibility of financial incentives -- possibly through tax rebates or credits -- to Massachusetts aircraft operators for reducing noise at the source, either through retrofitting or the acquisition of quieter aircraft.

5. FUTURE USE OF CERTAIN AIRPORTS

- Continue to press for the relocation of the Air National Guard from Westfield to Westover.

- Encourage joint civil/military use of Otis AFB and South Weymouth NAS. According to BBN's findings, the addition of civil operations to Otis and South Weymouth would produce very insignificant changes in the noise exposure levels (less than one half decibel in both cases). Joint use at these two sites would, however, permit a decrease in activity at Norwood and Hyannis that would result in a modest reduction in noise exposure levels there.

- The MAC is presently developing study elements for a Continuous Airport System Planning Program which we hope will get underway within the next few months. Two items that have particular relevance to noise abatement are:

  - Exploration of possible alternative site(s) for training (touch and go) operations, such as Fort Devens in Ayer.

  - Identification of cost/benefit elements -- including noise -- that will enable us to develop some criteria for determining which airports are critical to the Commonwealth and should remain in the state system plan.

6. LAND USE

- Where it is economically and politically feasible to do so, the use of land in the vicinity of airports should be kept compatible with the existing and forecast noise impact. This is primarily a state and local responsibility, although the U.S. has recognized its national significance in PL 94-353 which renewed the Airport

Development Aid Program (ADAP) and was approved on July 12, 1976. This act, for the first time, makes eligible federal grants for up to 90% for "any acquisition of land or of any interest therein necessary to ensure that such land is used only for purposes which are compatible with the noise levels of the operation of a public airport."

- We will seek to take full advantage of the opportunities offered by this act to promote compatible land use adjacent to the Commonwealth's airports. Our emphasis will be on the acquisition -- through eminent domain or negotiated sale -- of vacant land or of any interest therein. We shall support the acquisition of existing property or interest therein by negotiated sale (e.g. the consent of the owner).

- Communities must exercise a more responsible role in preventing further encroachment by residential development in areas with existing or forecast unacceptable levels of noise. Toward this end we hope to work more closely with local planning and zoning boards to help identify and pursue non-residential land use alternatives near airports.

- Look into existing state consumer legislation and regulations that would lead to full disclosure, during real estate transactions, that property is in a noise impacted area.

- Support physical changes at airports that would provide noise relief to the most affected residential areas.

7. MAC NOISE BILL

The MAC noise bill is being filed for consideration in the 1977 session of the Legislature. It contains elements that will clarify our existing authority and add some essential tools that we need to achieve our noise abatement goals. Passage of the noise bill is especially important because:

-- It provides for setting of reasonable noise standards.

-- It sets forth a structure and process for noise abatement with roles and responsibilities clearly spelled out for all participants such as appropriate state and local agencies, airport neighbors and airport users.

-- It requires action by airport proprietors.

-- It requires compatible land use decisions by localities.

-- It broadens the zoning enabling statute to include zoning to provide protection from airport related noise.

-- It amends existing law so that negotiated land purchase (at fair cash value) by a municipal proprietor is a real option.

-- It authorizes land acquisition for noise abatement purposes.

This seven point program is an essential agenda for action, not only to provide much needed noise relief for airport neighbors but also to insure the continued viability of the Commonwealth's airport system. Airports, and the services they provide, are an essential part of the economy and life style of the Commonwealth; they must be preserved and improved, but in harmony with the environment.